STROUD™ WATER RESEARCH CENTER

Protecting Headwaters:

THE SCIENTIFIC BASIS FOR SAFEGUARDING STREAM AND RIVER ECOSYSTEMS

A Research Synthesis from the Stroud™ Water Research Center

Small headwater streams like this one are the lifeblood of our streams and rivers. Protecting these headwaters is essential to preserving a healthy freshwater ecosystem and protecting our freshwater resources.

HEALTHY HEADWATERS ARE ESSENTIAL TO PRESERVE OUR FRESHWATER RESOURCES

Scientific evidence clearly shows that healthy headwaters — tributary streams, intermittent streams, and spring seeps — are essential to the health of stream and river ecosystems. The evidence demonstrates that protecting these headwater streams with forested riparian buffer zones and protecting and restoring the watersheds in which they arise will provide benefits vital to the health and well-being of Pennsylvania's water resources and its citizens.

Healthy, undisturbed headwaters supply organic matter that contributes to the growth and productivity of higher organisms, including insects and fish. Headwaters also help to keep sediment and pollutants out of the stream system's lower reaches. In addition, they enhance biodiversity by supporting flora and fauna that are uniquely acclimated to this habitat.

FORESTED BUFFER ZONES PROTECT VULNERABLE HEADWATERS

Forested buffer zones protect these headwaters in a variety of ways. They promote broad, shallow streams with a greater total area of aquatic habitat and a broader diversity of habitats. They help protect headwaters from both point-source and non-point-source pollution.

Forested buffer zones slow erosion from flooding and help to keep water cool, a critical factor in streams that support trout and other cold-water species. These types of protections will grow more important as climate change raises average temperatures,

The brook trout, the state fish of Pennsylvania and the only trout native to small streams in the Commonwealth, requires the cooler waters which forested streams provide for survival.

and if the frequency and severity of storms increases.

The small size of these headwaters and their integration into the landscape makes them exceedingly vulnerable to degradation when those landscapes are altered by construction or agriculture. Their small size also means that the degradation of just one headwater may escape detection downstream, but cumulatively the destruction of many small headwaters would have negative impacts on water resources. Headwaters are not as resilient as larger streams when disturbed because they lack sufficient flows to transport sediments associated with erosion and sedimentation, and animal life in them is usually coldwater adapted and thus sensitive to temperature increases associated with forest removal.

CURRENT PENNSYLVANIA REGULATIONS FALL SHORT OF PROTECTING HEADWATERS

We know that headwaters provide important benefits for entire stream systems. We know how they are damaged, and how they can be protected. Unfortunately, current regulations do not provide adequate protection for these important resources because they have not been updated to reflect the the findings from current scientific research.

Evidence shows that very small watersheds (some as small as 5.5 acres) can support both permanent and intermittent headwater streams. But the Commonwealth of Pennsylvania allows waivers for the disturbance of watersheds with drainage areas of 100 acres or less.

SCIENCE-BASED RECOMMENDATIONS CAN PROTECT OUR HEADWATERS

Based on our current understanding of their ability to support vital headwater streams, we recommend that these smaller watersheds be protected. We further recommend that riparian forests be adopted as a best management practice and that these forested buffers be preserved and restored along as many reaches as possible in Pennsylvania and throughout the Piedmont and other landscapes that were historically forested.

About The Stroud Water Research Center

The Stroud™ Water Research Center seeks to advance knowledge and stewardship of fresh water through research, education and global outreach and to help businesses, landowners, policy makers and individuals make informed decisions that affect water quality and availability around the world. The Stroud Water Research Center is an independent, 501(c)(3) not-for-profit organization. For more information go to www.stroudcenter.org.

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Sierra Club provided partial support for writing this white paper. Editing and executive summary by Matt Freeman.

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